

REMARKS

SUMMARY

Reconsideration of the application is respectfully requested.

Claims 1 and 15 have been amended to correct previously undetected informalities; the amendments have not been entered to overcome prior art and no new matter has been introduced.

Claims 4-14 have been withdrawn.

Claims 19-25 have been added to more fully claim embodiments of the present invention; these new claims have not been added to overcome prior art and no new matter has been introduced.

Accordingly, Claims 1-3 and 15-25 remain pending.

Restrictions

Applicants confirm election of Claim Set I. (Claims 1-3 and 15-18) for prosecution on the merits and Claims 4-14 are hereby withdrawn. Further, Applicants preserve the right to traverse the restriction, at a later time, and pursue the non-elected Claims 4-14 in a divisional application.

Claim Rejections under 35 U.S.C. § 102(e)

In "Claim Rejections – 35 USC § 102", item 2 on page 4 of the above-identified Office Action, Claims 1-3 and 15-18 have been rejected for being anticipated by either U.S. Patent Application Publication No. 2004/0252772 to Ramanathan *et al* (hereinafter "772"), or U.S. Patent Application Publication No. 2005/0003650 to Ramanathan *et al* (hereinafter "650") under 35 U.S.C. § 102(e).

As will be explained below, it is believed that the claims are patentable over the cited art in their original form and, therefore, the claims have not been amended to overcome the references. Applicants therefore traverse.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 1 requires:

a first wafer having a first interlayer dielectric layer and a first plurality of copper structures of first **substantially uniform heights** with each difference between any two of the first substantially uniform heights **being 5 nm or less**, disposed on the first interlayer dielectric layer; and

a second wafer having a second interlayer dielectric layer and a second plurality of copper structures of second substantially uniform heights with each difference between any two of the second substantially uniform heights being 5nm or less, disposed on the second interlayer dielectric layer, the second wafer being stacked on the first wafer, with at least **some of the first and second plurality of copper structures being substantially aligned and bonded to each other**.

As such, Claim 1 recites novel copper structures having (a) **substantially uniform heights with each difference of any two to be 5nm or less**, and (b) some of these **copper structures being bonded to each other**.

To establish a *prima facie* case of anticipation under 35 U.S.C § 102, the Office Action must identify where **each and every facet** of the claimed invention is disclosed in the '772 reference, or independently in the '650 reference, in accordance with *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1462 (Bd. Pat. App. & Interf. 1990), see also *Electro Med. Sys. S.A. v. Cooper Life Sciences*, 34 F.3d 1048, 1052, 32 U.S.P.Q.2d 1017, 1019 (Fed. Cir. 1994).

The '650 reference merely teaches the pillars are formed with a conventional CMP process (see e.g., paragraph 24), resulting in conventional uniformity of micrometer scale, which in turn leads to conventional inter pillar gap of micrometer scale (see e.g., paragraph 28 where it is stated that the gap between the pillars is “at best” 3-5 μ m). Thus, the '650 reference clearly does not anticipate the required uniformity of nanometer scale, specifically, 5nm or less (which will lead to a worse case of inter pillar gap of no more than 10nm).

The '772 reference discloses an approach that may improve the uniformity of the pillars and therefore their interconnections. The '772 reference disclosed that the conductor structures 233u and 283u are first capped with metal interlayers 250 and 290, and the conductor structures are interconnected by bonding the metal interlayers 250 and 290

together (see e.g., paragraph 0021, Figure 2E, process step 130 of Figure 1, and Figure 2F). Thus, the '722 reference failed to anticipate the required nanometer scale uniformity as well as the required bonding of the copper structures to each other.

Therefore, for at least these reasons, Claim 1 is not anticipated and is patentable over either reference '650 or '772 under 35 U.S.C. § 102(e).

Independent Claim 15 includes in substance the same recitation as described for Claim 1. Thus, for at least the above stated reasons, Claim 15 is not anticipated and is patentable over either the '650 or '772 reference under 35 USC § 102(e).

Claims 2-3 and 16-18 each depend from independent Claims 1 or 15 incorporating their corresponding limitations. Thus, for at least the above stated reasons, Claims 2-3 and 16-18 are not anticipated and are patentable over either the '650 or '772 reference under 35 USC § 102(e).

New Claims 19-25

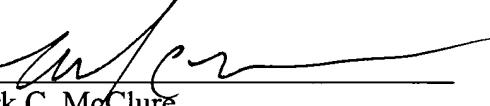
Independent new Claims 19 and 22 recites novel interconnect structures having substantially similar limitations as described for Claim 1. Thus, for at least the above stated reasons, new Claims 19 and 22 and their dependant Claims 20-21 and 23-25 are not anticipated and are patentable over either the '650 or '772 reference under 35 USC § 102(e).

CONCLUSION

In view of the foregoing, reconsideration and allowance of Claims 1-3 and 15-25 are solicited. Applicants submit that Claims 1-3 and 15-25 are in condition for allowance. Accordingly, a Notice of Allowance is respectfully requested. If the Examiner has any questions concerning the present paper, the Examiner is kindly requested to contact the undersigned at (206) 407-1504. If any fees are due in connection with filing this paper, the Commissioner is authorized to charge the Deposit Account of Schwabe, Williamson and Wyatt, P.C., No. 50-0393.

Respectfully submitted,
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Date: April 28, 2005

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